

Disease prevention and health promotion programs: benefits, implementation, quality assurance and open questions - a summary of the evidence

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Disease prevention and health promotion programs: Benefits, implementation, quality assurance and open questions – A summary of the evidence

Abstract

Aim: Disease prevention and health promotion programs are standardized behavioral interventions that may be combined with contextual interventions. With optimized methods, they offer proven efficacy, efficiency, transparency, manageability, and rapid transfer of knowledge.

Subject and methods: This review summarizes their central barriers and success factors based on current research.

Results: Important barriers to effective use of disease prevention and health promotion programs are low implementation fidelity, exaggerated flexibility subject to political change, inadequately trained and overworked personnel, disregard of context, change of implementation frameworks, lack of supportive contextual interventions, a plethora of programs, scarce resources and weak organizational support, resistance to social technologies, choices based on marketing criteria instead of effectiveness, and research gaps. Solutions include robust intervention plans, clear and comprehensive manuals, definition of intervention core and periphery, organizational and leadership support, qualification of users, systematic adaptation to local conditions, and quality assurance / monitoring of acceptance and effectiveness.

Conclusion: Both users and decision-makers should demand proof of effectiveness of program choices and should adhere to quality assurance procedures during implementation. Program development and evaluation should ensure (i) the definition of core intervention components, (ii) instructions for adaptation of programs to specific contexts, (iii) basic data on resources required for implementation, and (iv) evidence of program effectiveness.

Keywords:

Disease prevention, health promotion, health education, program, implementation, quality assurance

Introduction: Program types and objectives

A common classification defines the main types of disease prevention and health promotion (DPHP) interventions, as incorporated in various quality development approaches, as follows (Töppich and Lehmann 2009):

1. *Setting projects*: are designed for the health-oriented transformation of entire living environments or settings (e.g., schools, day care centers or communities) following the WHO-based principles of the Ottawa Charter, which emphasize the participation and involvement of target groups and stakeholders, the concept of community empowerment, networking to build alliances for health promotion and education, and the prevention of individual risk factors and risk behaviors by contextual interventions (Engelmann and Halkow 2008).
2. *Campaigns*: involve concerted measures with media support that follow an overall intervention plan, the goal of which is to achieve increased health awareness and behavior changes in major target groups. Subtypes include media campaigns that combine mass media messages (e.g., series of exhibitions, lectures or ads on the reduction of alcohol consumption or smoking in adolescents (Bonfadelli and Friemel 2006). Another subtype involves the social development of a broad alliance of health care and political actors for concerted promotion of health awareness on different issues, such as rapid and high-quality care for stroke victims through many channels, in many cases, with supportive media campaigns (Hannon et al. 2009; Rosecrans et al. 2008; Scheier and Grenard 2010).
3. *Contextual interventions (structural, environmental)*: involve sociopolitical action aimed at changing risk behavior opportunities and decreasing the accessibility and cost-effectiveness of risk substances by measures such as raising taxes, banning advertising and/or restricting access to cigarettes or alcohol and installing water coolers in schools.
4. *Individual measures*: short-term health projects which follow specific local approaches (e.g., lectures for school classes or ad hoc training for day care managers).
5. *Programs, i.e., reproducible and standardized behavioral interventions*: A program is an intervention plan template that specifies the approach to a defined goal and describes the model for solution of this task in an intervention manual. A program can also be used as part of a campaign; it often includes recommendations for contextual interventions, such as "reactively" addressing intoxicated adolescents in hospitals and "proactively" developing local drug prevention networks (Steiner et al. 2007).

There is some dispute as to whether multiplier training for non-standardized interventions (e.g., training of specialists for setting projects in communities) should be classified as programs. However, the multipliers' interventions can be seen as a setting project or as individual action, whereas the training itself can be classified as a train-the-trainer behavioral program designed, for example, for promotion of resilience in nurseries (Fröhlich-Gildhoff et al. 2007; Guevel and Jourdan 2009; Hahn et al. 2002). Thus, train-the-trainer interventions can be evaluated the same as all other programs.

Challenges to the implementation of evidence-based, standardized procedures in health care are not limited to prevention and health promotion, but also affect highly regulated and well-researched fields of action (Driscoll et al. 2011). As social technologies, DPHP programs have triggered fundamental and controversial discussions (Rosenbrock 2008; Rosenbrock and

Michel 2006; Wulfhorst and Hurrelmann 2009). The following sections therefore present a problem-oriented summary of the status of research on the usefulness and requirements for programs. This unsystematic review encompasses fundamental research and review articles as well as exemplary studies investigating the methods and effectiveness of programs and listed this in their abstracts, keywords or title. It is not intended as a meta-analysis of efficacy but rather as a structured review of important benefits and requirements regarding the use of programs.

Advantages and benefits of programs

Program-based intervention offers a number of advantages to target groups, professionals and funding agencies (e. g. Hurrelmann et al. 2004; Kalke et al. 2004; Naidoo and Wills 2003; Wulfhorst and Hurrelmann 2009):

(1) Efficacy: Programs have defined goals, target groups, operating conditions and procedures, making it possible to evaluate their efficacy and effectiveness. A successful intervention is reproducible under similar conditions. Among the large number of moderately effective programs for prevention of drug abuse among children and adolescents (Soellner and Kleiber 2005; H. Thomas et al. 2005; R. Thomas and Perera 2008), a few had sustainable effects over a 15-year period (Skara and Sussman 2003).

(2) Efficiency: Programs can be implemented at a favorable cost-benefit ratio for the community as well as for the professionals, funding agencies and target groups for a number of reasons: Development and evaluation can be performed very meticulously, but are one-time costs that benefit all implementation sites later. Programs allow for rapid and targeted responses to health-related needs, and can be carried out by trained personnel. From the first steps on, a well-planned, high-quality and proven effective procedure can be implemented without detours. Programs are optimized for maximal effect, so they can quickly achieve significant effects, which enhances the motivation for participation (Ribeiro et al. 2010). Here is one recent example: In a study of nine different programs to promote physical activity in the UK from 2004 to 2006, health improvement was observed in around one-third of all participants (Pringle et al. 2010). The implementation cost per participant ranged from c£55 to c£3,420, and the cost per quality of life year (QALY) gained from intervention types ranged from c£47 to c£509. This is much less than the £20,000 threshold implicit in the British National Institute for Health and Clinical Excellence (NICE) decisions, which is now conventionally used in many countries. Future cost savings per intervention participant were estimated to be c£769 to c£4,891.

(3) Transparency, limits and controllability: Programs give organizations a manageable range of targets with defined costs, approaches, time horizons and benefits and therefore provide a high potential for consensus between stakeholders in DPHP services and organizations. Interventions are possible if consensus on their objectives can be reached. It is not necessary to redesign the entire organization. This minimizes resistance. By virtue of their transparency, programs can be evaluated by cost-benefit analysis and in terms of their contribution to public health goals, making this a fair selection criterion (DuShaw 1984; Helming et al. 2007).

(4) Knowledge transfer and professional development: Programs promote the professional development of DPHP staff because the user training programs and program manuals give the implementers an introduction to the state of research and professional practice and provide them potentials for new, evidence-based problem solutions. Programs increase problem-solving skills in DPHP. After widespread implementation, program operating conditions and areas in need of improvement can be identified and continuously added to the manual. Reviews of different programs can be used to comparatively determine the most effective strategies. One review identified the most effective school-based drug prevention programs as those with interactive teaching methods, peer leaders, and a focus on general life skills and the social influence model, particularly by addressing risk behavior and drug abuse in the target groups, which were additionally supported by community interventions designed to reshape contextual conditions of consumption and to emphasize sensitivity to social norms (Cuijpers 2002).

Problems in program implementation

On the other hand, research demonstrates the difficulties in exploiting the opportunities afforded by DPHP programs. One review of 30 high-quality studies on school-based drug prevention programs showed that most prevention programs are not effective in broad use (Cuijpers 2002). Many institutions do not adopt entire programs, but only parts or concepts of the programs (Barr et al. 2002; Miller 2001). Furthermore, the programs do not remain functional in all institutions, even when considerable funds are invested. One study revealed that, although a state violence prevention agency invested nearly 60 million USD in 170 model prevention programs in over 120 communities, only 45% were operating at the same level or a higher level than the final year of funding, and 33% of the interventions were no longer operating 5 years post-funding (Tibbits et al. 2010). What are the causes of this lack of sustainability? A number of original studies and reviews deal with this subject (e. g., Fulop et al. 2000; Swerissen and Crisp 2004; Wagner et al. 2005):

- **Low program fidelity and implementation quality:** A number of programs are implemented spottily and with serious deficiencies, e.g., in the area of HIV/AIDS prevention (Bertozzi et al. 2008), school-based drug prevention (Pentz et al. 1990; Sloboda et al. 2009), and obesity prevention in children and adolescents (H. Thomas 2006). Health insurance companies, the main providers of disease prevention programs in Germany, have established quality criteria and evaluation instruments for their health courses but do not use them consistently; therefore, the effectiveness of their courses remains unproven (Bundesrechnungshof 2010).
- **Exaggerated flexibility subject to political change:** The limited applicability of programs encourages their intermittent use, for example, in workplace health promotion (Kliche et al. 2009). In cases where the objectives of programs are ambiguous or subject to political instability (e.g., government changes), programs are susceptible to senseless changes by virtue of their flexibility and transparency.
- **Inadequately trained and overworked personnel:** An overworked staff is a common reason for the lack of program integrity. The lower the work load, the higher the level of education, and the more extensive the introductory training, the higher the willingness of

staff to utilize evidence-based interventions (Rabin et al. 2010). Inadequately trained staff members are often recruited due to lack of the field experience or time pressure (Hasson 2010). One study found that health education instructors differ in terms of role perception, and that a knowledge transfer- and control-based role perception can weaken health promotion programs (Jourdan et al. 2010).

- **Disregard of context:** Programs must be appropriate for their specific context (August et al. 2006; Kliche et al. 2004). The indiscriminate transfer of a program from one context to another presumed to be fairly similar can impair program effectiveness. For example, a school-based program can lose effectiveness when transferred from a mandatory to a voluntary after-school setting (Gottfredson et al. 2010). Due to the large amounts of funds invested in them worldwide, intensive efforts have been made to improve the selection of prevention interventions in HIV/AIDS prevention (Bertozzi et al. 2008). A number of factors contribute to the selection of inappropriate programs, including misleading stereotypes about target groups (e.g., "stoners") held by organization leaders, and the practice of opening of slots to less needy participants simply to fill up classes. A fundamental dilemma also plays a role: Health care innovations are usually implemented at a stage where feasibility studies and intervention development have been completed and the efficacy of the intervention has been proven, but its broad-spectrum effectiveness has not been tested because the intervention has only been broadly introduced once and may have to be modified. If a program is to be implemented in a different context, even if that context is a related subfield such as drug prevention in schools, it should be tested for effectiveness in that specific context prior to implementation (Jerusalem 2003).
- **Change of implementation frameworks:** Organizational characteristics have a direct impact on program efficacy. Thus, school culture has an effect on drug prevention programs in terms of participation opportunities, ways of dealing with violence, performance norms, common values, etc. (Aveyard et al. 2004; Fletcher et al. 2008; Reid et al. 2006). The transfer of a program from one context to another, even if organizationally similar (e.g., from one school to another), should therefore be very carefully considered (Kliche, Hart et al. 2010).
- **Lack of supportive contextual interventions:** Behavioral interventions often require a high level of motivation on the part of the participants. Combining such measures with simple contextual or organizational interventions (e.g., raising taxes on cigarettes, regulating cigarette vending machines, and making test purchases to check vendor compliance can enhance smoking prevention interventions; changing the structure of work organization to make time for stress management exercises; and providing ergonomic furniture to enhance back exercise classes) makes both approaches significantly more effective (Awa et al. 2010; Bornhäuser et al. 2002; KKH and Walter 2006). However, many programs omit clear instructions for supportive contextual interventions because these may require changes in the entire organization that might exceed the competencies, mandates or objectives of the implementers.
- **Plethora of programs:** Even professionals find it hard to maintain an overview of the plethora of programs and select the most appropriate programs for a specific case (Kliche 2011). An (incomplete) search revealed at least 419 primary prevention programs for children in Germany alone (Gerlach et al. 2009; Noweski 2009). Confusing concomitant research is forcing the funding agencies to do their own evaluations, which do not necessarily increase clarity. One US public health department alone developed and

implemented 34 program evaluation plans and collected data on 52 indicators across 492 measurable objectives in an attempt to identify challenges and recommendations to improve evaluation processes (Reedy et al. 2005). Few public health agencies have the resources needed to create transparency of effects because the effectiveness of the interventions has not been proven.

- **Scarce resources and weak organizational support:** Readiness of the participating professionals and organizations for change is crucial (Wang et al. 2010). If a new program is introduced as an additional task, they tend to feel used and devalued. Therefore, the support of change is often tied to adequate funding. In addition to staff resources and long-term financial planning, it was found that the support of school principals and colleges is crucial for the stability of violence prevention programs in American schools (Tibbits et al. 2010).
- **Resistance to social technologies:** Programs imply "teaching-learning". Depending on a person's educational biography, this kind of learning can trigger an attitude of distrust, avoidance, and delegation of responsibility, especially when the target groups feel they are being disciplined or manipulated (Holzkamp 1993). Non-intentional effects may result. Drug prevention in male youth from ethnocultural subgroups, for example, can interact with a risk and macho culture. One study showed that after information about common risk behaviors had shown health-oriented participants that their health behavior was exemplary, their behavior subsequently worsened (MVPP 2008). Likewise, a recent review reported a relative increase in tobacco, alcohol and drug consumption among adolescents in 3 out of 20 studies investigated (Petrie et al. 2007).
- **Research gaps:** Ultimately, the benefits of programs will not become effective unless the facts that are potentially available are actually collected and analyzed. Compared to the clinical sector, prevention research suffers from structural weakness and underfunding in combination with heterogeneous work settings that place high demands on research planning (Kliche 2011). However, stringent designs are likely to evoke resistance in some fields because practitioners as well as funding agencies feel they are being monitored by robust evaluations that enable comparison. Therefore, despite years of high spending in an area such as HIV/AIDS prevention, and despite favorable results for some approaches such as for life skills training (Yankah and Aggleton 2008), inadequate progress has been made in this field. By 2008, only 21 stronger studies were available, including 17 on biomedical interventions and only a few on behavioral or structural interventions (Galarraga et al. 2009). Methodologically inferior evaluations, however, usually underestimate the effects of interventions due to measurement imprecision (H. Thomas 2006). This condition in many subareas is not attributable to a lack of funds alone, but also to unclear program theories that are so immune to empirical findings that they justify further studies that could be career-enhancing and thus attractive to researchers (H. Thomas 2006).
- **Choices based on marketing criteria instead of effectiveness:** Research gaps, complexity and unclear implementation conditions encourage the use of irrelevant selection criteria like the public visibility of decision-makers and their agencies, the image and customer loyalty of health insurance companies, and personality profiling of managers (Bertozzi et al. 2008; Kliche 2011). Competition between funding agencies additionally leads to the unconnected and uncoordinated implementation of programs, resulting in the inclusion of non-target groups, which spoils the effectiveness of the

programs. Implementation in less needy target groups results in ceiling effects, whereas implementation in hopeless situations leads to floor effects. For example, it is unlikely that croupiers or betting agency owners who benefit from gambling will intervene when they observe symptoms of pathological gambling, although many current staff training interventions in Germany operate on this assumption.

Methods for the enhancement of quality and effectiveness

Robust intervention plan: The simpler the program structure, the easier and more reliably it can be utilized by professionals and target groups. Programs with a small number of modules and intervention techniques appear to work better, particularly for socially disadvantaged target groups (Michie et al. 2009).

Clear and comprehensive manuals: According to the state of research, program manuals should contain the following elements (Ströbl et al. 2009; Ströbl, Küffner et al. 2007): Objectives, target groups, area of use (framework conditions such as field of work and access), inclusion and exclusion criteria, group form and size, modules (individual blocks of action) and their subject areas, number, duration and frequency, instructor qualifications, room size and equipment, media and materials and their applications, preliminary and follow-up measures, measures for inclusion of the social environment (e.g., family members), and measures for quality assurance and evaluation. The environment should support the program objectives (e.g., non-smoking hospital for tobacco prevention programs). If necessary, the manual should specify appropriate contextual prevention requirements (e.g., how a non-smoking school should be structured and where to find a roadmap for its introduction). Program experiences should be documented and shared (e.g., regarding proven methods of handling target subgroups). Topics, verifiable learning objectives, time requirements, methods and their sequence, and objectives, teaching principles and materials (worksheets, films, introductory questions, presentation methods, etc.) should be specified for each module (e.g., each session). It is important that implementers are informed on possible margins of discretion to adapt aspects of the program without compromising its effectiveness.

Definition of intervention core and periphery: Differentiation between minimum elements that are necessary for implementation and variable components that may be adapted to local conditions encourages the diffusion of innovations in health care (Kliche 2010). Thus, high-quality programs (e.g., for promotion of physical activity in schools) include integral procedural steps that ensure target group-oriented adaptation (Ribeiro et al. 2010). Different forms of participation are available which help to integrate practical knowledge in the adaptation of programs (Wright 2010).

Organizational and leadership support: The management should approve of and appropriately fund and equip DPHP programs. This attitude becomes clear at an early project stage and can determine the sustainability of program use, e. g. in schools (Payne 2009; Tibbits et al. 2010). Agreements or voluntary self-commitments, a continuous flow of information, the appointment of responsible parties or contact persons and their substitutes, and the allocation of working time for the task are central methods to commit the entire organization (GKV-Spitzenverband 2010; Ströbl et al. 2009).

Qualification of users: Programs increase the professional competence of implementers to conduct effective interventions. The manual and introductory training should emphasize this benefit. Users need appropriate basic qualifications, training and continuing education for the program (GKV-Spitzenverband 2010; Ströbl et al. 2009). Professional competence is also an important factor for self-efficacy and confidence in change (Sale et al. 2008). Introductory coaching or electronic support messages (e.g., for reminders, post-program feedback or invitations for booster sessions) can support professional effectiveness (Hahn et al. 2002; Ringwalt et al. 2010). The time required for training and implementation support can be substantial (Hunter et al. 2009) and should be quantified by the manual. The support of most or all professionals in the field of application is important. In schools, for example, the teachers act as opinion leaders. The entire school staff should be motivated for a program and endorse a health-oriented organizational culture and not limit their professional concept to a technical understanding of teaching isolated facts from different disciplines (Jourdan et al. 2010).

Systematic adaptation to local conditions: The following steps are useful for the adaptation of programs to new contexts (Card et al. 2011):

1. Selection of a program based on objectives, evidence, suitability, accessibility and attractiveness for the target groups as well as adequate resources available to the implementing organizations.
2. Compilation of all materials.
3. Development of a program theory, i.e., a model of causal relationships between strategies, activities, services, short-and long-term goals, and changes in the target groups.
4. Definition of core elements of the program.
5. Definition of the need for adaptation of goals to target groups (e.g., age, education, culture and language groups), to implementing institutions (e.g., profiles of services provided, qualifications, language skills, target group access), and to intervention settings (e.g., norms and values, management structure, accessibility and local public transport).
6. Adaptation of the program theory, e.g., simplification by concentrating on a target subgroup.
7. Adaptation of the program's core elements to the new setting (language and images, state of development, norms and values, scientific updating, training materials, and evaluation instruments).

Quality assurance and monitoring of acceptance and effectiveness: Supporting methods for the adequate use of a program include: introductory training and supportive measures for users (coaching/supervision, hotlines, chats, counseling), regular user meetings and conferences offering an exchange of experience, check lists for module implementation, models of good practice, user surveys to improve the modules (e.g., for new target subgroups), sample documents for important steps (e.g., sample letters and brief project profiles for multipliers), the appointment of program champions responsible for monitoring and disseminating information on improvements and new findings regarding the program (e.g., Ringwalt et al. 2010; Rohrbach et al. 2010; Ströbl et al. 2009). Participation data provide brief insight into the acceptance, facilitator surveys on problems of use, and basic participant surveys on satisfaction and selected outcome indicators (Ströbl, Friedl-Huber et al. 2007). This requires the selection of valid endpoints to gather data quick and easy, analyze and

evaluate in practice (Kliche, Riemann et al. 2010; Loss et al. 2007). Today, first-rate quality assurance procedures such as *QIP*, *PREFFI* and *IDM* are suitable for testing program integrity, contextual fit and adaptation, and the linkage of behavioral and contextual interventions (Kahan and Goodstadt 2005; Molleman et al. 2005; Töppich and Lehmann 2009).

Conclusion: Future tasks

Some requirements for program implementation can be derived from this body of evidence. There are requirements related to program development:

1. There should be a clear and comprehensive manual defining
 - clear objectives with measureable indicators applicable in practice
 - the operating conditions, the necessary resources, and the costs of program launch and implementation
 - the elements necessary for effectiveness
 - the steps for the adaptation of the program or parts of it to a specific setting (e.g., instructions for combining the program with contextual interventions), if applicable.
2. Quality assurance measures should be available during program launch and implementation.
3. Data on user experiences (e.g., effects) should be aggregated and published.

Some recommendations concern DPHP funding agencies:

4. The selection of programs should follow their suitability for specific target groups and settings. The selection should include a research and discussion stage, if necessary. The above characteristics of effect-oriented, user-friendly program design (cf. section 4) can serve as reference points for selection criteria.
5. There should be evidence of health-related effects. If the evaluation only covers efficacy, then effectiveness must be observed during the implementation, at minimum, using selected indicators for a simple analysis of different subgroups (Donner-Banzhoff 2009). If effectiveness has already been tested, the program should at least achieve small effect sizes and better efficacy than other approaches under real-life conditions in broad target groups.

Finally, tasks for research emerged:

6. Methods for the selection and combination of effect-enhancing contextual interventions in synergy with programs should be reviewed and added to the manuals (Lister-Sharp et al. 1999).
7. Simple quality assurance measures for programs should be provided that are not perceived as de-motivating and controlling.
8. Instruments for the cheap, rapid and valid analysis of implementation quality should be developed. They provide data that support efficacy and provide certainty about whether a program or its local implementation are to blame for weak effects. If program fidelity data

are available, then evaluation methods such as progress assessment, goal-oriented program evaluation and program theory evaluation can be used to analyze the efficacy, even for complex interventions (Regeer et al. 2009; Schochet 2009; Weitzman et al. 2009; Znoj and Regli 2006). Until now, program integrity has been analyzed in a highly program-specific and cumbersome manner (e. g., Hasson 2010), i.e., with little hope of wide-scale implementation. Even simple short protocols for individual steps and interventions are used reluctantly and incompletely (Kliche, Hart et al. 2010). Therefore, program evaluators have often to rely on retrospective user or expert surveys (Curry et al. 2010).

9. Systematic program libraries for subfields should be established. Such libraries would allow users to compare programs based on their context, goals and performance criteria (in particular, cost and efficacy), and choose the ones that are suitable for their needs. A program library should contain the following program characteristics: Settings (e. g., daycare center, type of school, enterprise, community, etc.), objectives (weight reduction, promotion of a healthy diet, smoking cessation, alcohol or drug prevention, etc.) and target groups by age, sex and special characteristics (e.g., people with few resources, managers, teachers, etc.). In addition, users need information on program duration, costs, sources, procurement and implementation times (including informal preparation times), support required by their organizational management, training and qualification requirements, and anticipated effects according to the evidence.

In Germany, these tasks are currently being taken forward by a prevention research funding initiative. The Federal Ministry of Education and Research provided approximately 20 million Euros for around 60 prevention research projects from 2004 to 2012. Over 50 research institutions and more than 200 practice partners are involved. The project leaders develop programs, test their efficacy and effectiveness, expand the methods of quality assurance, and test new approaches to disease prevention and health promotion, especially in vulnerable groups such as children and adolescents, older people, and people in difficult social circumstances. An overview of these activities is provided on the KNP (Cooperation For Sustainable Disease Prevention) homepage: www.knp-forschung.de. KNP provides a network for application-oriented disease prevention research for science and practice as well as for professional associations and decision makers. Additionally, KNP promotes the dissemination of disease prevention research in professions, health care policy, social policy and education policy, and supports collaboration and structure-building in the field. Work groups for practice transfer, policy transfer, health inequality, methods, participatory healthcare research, and prevention and rehabilitation currently exist. Persons or institutions interested in international cooperation are invited to contact the KNP (walter.ulla@mhh.de).

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